

REMARKS

This amendment is responsive to the non-final Office Action mailed on April 26, 2006. Claims 1, 2, 4-9, 12-14, and 22 are pending. Claim 1 is amended. In view of the foregoing amendment, as well as the following remarks, Applicants respectfully submit that this application is in complete condition for allowance and request reconsideration of the application in this regard.

Rejections under 35 U.S.C. § 103(a)

Claims 1-11, 13, 14, and 22

Claims 1-11, 13, 14, and 22 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Applicants' admitted prior art Fig. 1 (hereinafter *APA*) in view of U.S. Patent No. 5,994,178 to *Wu*. The Examiner admits on page 5 of the April 26, 2006 Office Action that the *APA* fails to teach "selectively depositing the silicon dioxide in the STI region without depositing the silicon dioxide on the first and second active regions." The Examiner contends on page 5 of the April 26, 2006 Office Action that *Wu* teaches "filling STI trenches with an LPD oxide." The Examiner further contends on page 6 of the April 26, 2006 Office Action that it would have been obvious to correct the deficiency of the *APA* with the disclosure in *Wu* because "Wu teaches the use of an LPD oxide to fill the STI trench produces a planar surface and lower budgets." Applicants respectfully disagree with the Examiner's contentions for the reasons set forth in the following remarks.

Specifically, claim 1 sets forth that the silicon dioxide is selectively deposited in the shallow trench isolation region "without depositing the silicon dioxide on the first and second active regions by nucleating the deposition of the silicon dioxide on the buried oxide layer." The Examiner admits that this represents a deficiency of *APA*, which is the reason that the Examiner requires *Wu* as a secondary reference. *Wu* discloses that the silicon dioxide is deposited in a shallow trench isolation region in a bulk silicon substrate. Consequently, *Wu* fails to disclose that the deposition of the silicon dioxide is nucleated on a buried oxide layer, as set forth in claim 1, because *Wu* fails to disclose or suggest the use of an SOI wafer. A bulk silicon substrate, as disclosed in *Wu*, does not include a buried oxide layer. It follows that the combination of *APA* and *Wu* fails to teach or suggest all the claim limitations. Consequently, for at least this reason

alone, the Examiner has failed to properly support that independent claim 1, as amended, is *prima facie* obvious. Hence, Applicants submit that independent claim 1 is patentable over *APA* in view of *Wu*.

Moreover, *Wu* fails to provide a motivation or suggestion that the method for depositing silicon dioxide in a shallow trench isolation region disclosed in *Wu* would have been compatible with an SOI wafer in which the shallow trench isolation region extends to the buried oxide layer. *APA* also fails to provide a suggestion that would have motivated a person having ordinary skill in the art to nucleate the deposition of the silicon dioxide on the buried oxide layer. Consequently, for at least this additional reason, the Examiner has failed to properly support that independent claim 1, as amended, is *prima facie* obvious. Hence, Applicants submit that independent claim 1 is patentable over *APA* in view of *Wu*.

The Examiner states on pages 3 and 6 of the April 26, 2006 Office Action that “Applicant’s own specification states on the top of page 8; ‘This deposition occurs in such a manner that the oxide nucleates on, and grows from, the exposed surface of the BOX layer 204’.” The Examiner relies on this statement to conclude that “the LPD of oxide inherently nucleates and grows on the on the (*sic*) buried oxide.” Applicants submit that this statement represents the epitome of hindsight analysis by the Examiner. According to *inter alia* MPEP §§ 2141, 2142, the legal concept of *prima facie* obviousness legally requires that the references must be viewed without the benefit of impermissible hindsight afforded by the claimed invention and the legal conclusion must be reached on the basis of the facts gleaned from the prior art.

On pages 2 and 3 of the April 26, 2006 Office Action, the Examiner seems under the impression that the references are being “attacked individually.” This is not accurate. Applicants are attacking the basis for the Examiner’s rejection under 35 U.S.C. § 103(a). To establish *prima facie* obviousness and with reference to MPEP § 2142, “the prior art reference (or references when combined) must teach or suggest all the claim limitations.” The Examiner admits in the April 26, 2006 Office Action that *APA* fails to disclose “selectively depositing the silicon dioxide in the STI region without depositing the silicon dioxide on the first and second active regions.” The Examiner requires *Wu* as a secondary reference. Applicant argues that *Wu* fails to correct this deficiency because *Wu* fails to disclose that the deposition of the silicon

dioxide is nucleated on a buried oxide layer. Hence, the combination of *APA* and *Wu* fails to disclose all the claim limitations.

Because claims 2, 4-9, 13, 14, and 22 depend from independent claim 1, Applicants submit that these claims are also patentable for at least the same reasons discussed above. Furthermore, each of these claims recites a unique combination of elements not disclosed or suggested by *APA* in view of *Wu*.

As a specific example, claim 8 recites one such unique combination of elements, namely, “cleaning the shallow trench isolation region before selectively depositing silicon dioxide”. The Examiner contends on page 7 of the April 26, 2006 Office Action that this is a “conventional step known to a skilled artisan,” and is “commonly known in the art to a skilled artisan.” Applicants note that *Wu* provides no disclosure or suggestion of cleaning the shallow trench isolation region before filling with oxide. Page 7 of Applicants’ specification alludes to the conventionality of the chemicals, but does not disclose that it is conventional to clean the shallow trench isolation region before filling with oxide. Instead, Applicants’ claim 8 sets forth cleaning a shallow trench isolation region. Consequently, MPEP § 2144.07 is not applicable for constructing a rejection of claim 8. For at least this additional reason, the Examiner has failed to properly support *prima facie* obviousness of dependent claim 8.

The Examiner states on pages 3 and 4 of the April 26, 2006 Office Action that “[t]he removal of etching residue, native oxides, and other contaminants is common and generally required in this art.” Assuming *arguendo* that this statement is accurate, which Applicants do not admit, the legal question that the Examiner must address to support *prima facie* obviousness is whether the subject matter of claim 8 would have been obvious to a person having ordinary skill in the art. The legal question is not whether or not “the removal of etching residue, native oxides, and other contaminants” is “common and generally required in this art.” On page 4 of the April 26, 2006 Office Action, the Examiner poses a rhetorical question to the effect that “how can the disclosure of conventional chemicals used to perform the cleaning step not make the cleaning step itself conventional?” Applicants respond that these conventional chemicals may be used to conduct a myriad of cleaning operations. Applicants disclose using these conventional chemicals to clean the trench before selectively depositing silicon dioxide. The proper legal question confronting the Examiner is whether the subject matter of claim 8 is

patentable. In determining the differences between the prior art and the claims, the question under 35 U.S.C. 103 is not whether the differences themselves would have been obvious, but whether the claimed invention as a whole would have been obvious. *See* MPEP § 2141.02. Applicants admit that the chemicals are conventional. Applicants traverse the Examiner's rejection that the subject matter of claim 8, in combination with the subject matter of claim 1, is *prima facie* obvious. This is how, paraphrasing the Examiner's own words, the disclosure of conventional chemicals used to perform the cleaning step does not make the cleaning step itself conventional.

The Examiner states on page 7 of the April 26, 2006 Office Action that the removal of etching residue, native oxides, and other contaminants is "alluded to in the specification (page 7, lines 24+) of the application." Again, the Examiner is apparently engaging in the epitome of hindsight analysis in violation of MPEP §§ 2141, 2142.

The Examiner also states on page 7 of the April 26, 2006 Office Action that "[t]he disclosure of the use of conventional chemicals to clean a trench obviates the cleaning step itself." First, these "conventional chemicals" disclosed in the application have various different uses. Second, the mere disclosure of "conventional chemicals" with multiple different uses cannot obviate a step of a process using those "conventional chemicals." Applicants believe that the only possible instance in which this could occur would be if a "conventional chemical" has only one possible use. That belief stated, Applicants cannot readily envision such a "conventional chemical."

Claim 12

Claim 12 stands rejected under 35 U.S.C. § 103(a) as unpatentable over Applicants' admitted prior art Fig. 1 (hereinafter *APA*) in view of *Wu* and further in view of U.S. Patent No. 5,851,900 to *Chu et al.* Claim 12 is patentable for at least the same reasons as claim 1. Moreover, *Chu et al.* fails to correct the deficiencies of *Wu*. Specifically, *Chu et al.* discloses shallow trench isolation regions formed in a bulk silicon substrate, not an SOI wafer, and the use of an oxide layer (22) lining the shallow trench isolation region to provide the selective deposition of silicon oxide. See *Chu et al.* at col. 4, lines 15-16. Claim 12 also sets forth a unique combination of elements not disclosed or suggested by *APA* in view of *Wu* and *Chu et al.*

Conclusion

Applicants have made a bona fide effort to respond to each and every requirement set forth in the Office Action. In view of the foregoing amendments and remarks, this application is submitted to be in complete condition for allowance and, accordingly, a timely notice of allowance to this effect is earnestly solicited. In the event that any issues remain outstanding, the Examiner is invited to contact the undersigned to expedite issuance of this application.

Applicants do not believe fees are dues in connection with filing this communication. If, however, any fees are necessary as a result of this communication, the Commissioner is hereby authorized to charge any under-payment or fees associated with this communication or credit any over-payment to Deposit Account No. 23-3000.

Respectfully submitted,

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Date

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